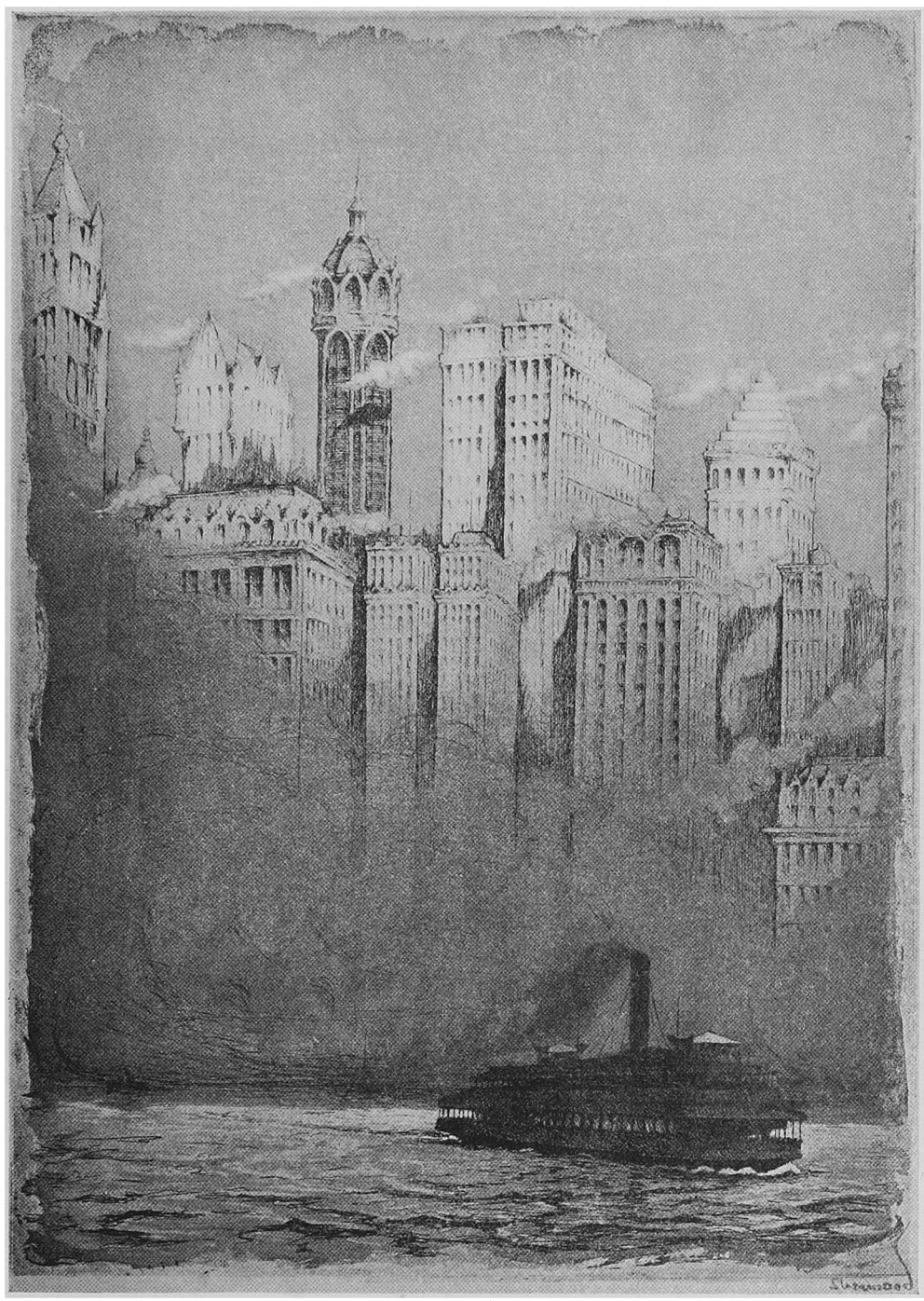

*Courtesy of Arthur H. Hahlo & Company.*

"Now, what would happen if a Kansas 'twister' should caper across the North River and squarely hit New York City where it lives the highest?"

*From an etching by Wm. A. Sherwood.*

# TORNADOES AND TALL BUILDINGS

By James Huneker

ABOUT twenty years ago there was a lively discussion in the American press provoked by an article that had appeared in a now defunct daily newspaper. The writer, evidently a meteorological humorist, described New York in the throes of a tornado visitation. With saffron realism the advent was pictured of a live Western tornado, a "twister" of the Kansas variety. Across the New Jersey meadows came this horrid monster, dangling a smoky funnel like the trunk of an elephant. The noise was indescribable, a cross between a thunderclap and the booming of a million railway trains racing full tilt over loose steel bars. Of course, the sky was green, livid, and lurid. When, according to the lively fancy of the romancer, the tornado struck the river, it dragged up the clouds in a watery embrace—or was it windy?—a wall of water. The tall Battery buildings disappeared in a twinkling; where the Post Office once stood was a hole full of mud and debris, and naturally the Brooklyn Bridge was racked to its foundations, its harp-strings snapped, and when last seen was going seaward on the pinions of the storm. What became later of the inky column we do not remember. But the damage had been done. A doubt had been insinuated in the minds of many God-fearing citizens that perhaps a whirlwind in New York City might play hob with its skyscrapers. Finally, architectural authorities being invoked the idea was pooh-poohed off the map. For instance, the Singer Building weighs 90,000 tons, rests on caissons and concrete. It has been estimated that the wind pressure is 128,000 foot-tons. To guard against the tendency to lift on the windward side a set of big steel rods are run down into the concrete 50 feet, thus anchoring the building to the foundation. This building is 49 stories high. It seems tornado-proof.

But only to return at intervals. Every spring and summer brings its crops of western and southern tornadoes. As a rule they occur on the outskirts of cities or wreak their fury among small-frame houses. We are often asked if these storms are on the increase. The answer is simple: they are not. As the western and southwestern states become thickly settled, casualties may seem more frequent, but the storms are of normal number. Losses to life and property, while not being greatly exaggerated—for the old-fashioned tornado "scare" headline has gone out of fashion in western journalism—are by no means out of proportion to the general average of living risks. This is proved by tornado insurance, a thriving branch of the business. As Prof. Cleveland Abbe wrote after the disastrous tornado of Kirksville, Miss., April 27, 1899: "In a few states, such as Illinois, Indiana, Iowa, Kansas, Maryland, Massachusetts, Missouri, and New Jersey, the probability that a given spot one mile square will be struck by a tornado is about once in a thousand years." Lightning and fire are more dangerous to mankind. Another fact important for residents of New York is that it has never suffered from a tornado, severe as have been storms in its vicinity.

Wallingford city in New Haven County, Conn., is not so far away. In August, 1878, there occurred a veritable "twister" of the veritable pattern; 34 persons were killed, 70 wounded, damage $200,000 (or about £40,000). Camden, New Jersey, suffered from a small tornado in August, 1885; 6 persons were killed, 100 injured, 500 houses razed, loss $500,000. I visited the scene of disaster the next day, and some of the buildings were levelled as if they had undergone a bombardment; yet across the Delaware River in Philadelphia there was no untoward disturbance—just a thunderstorm of average intensity. January, 1889, a most unusual season for "twisters," Brooklyn enjoyed a visit from a genuine whirlwind, funnel and all. It took place at 7.30 p. m. Its width was 500 to 600 feet, length 2 miles, whirl from right to left, roar heard 10 to 15 minutes before, loss $300,000. This was getting very near home. Chicago had a fright in 1876; the storm-cloud left the sky and bounded like a ball. St. Louis in 1890 caught a tartar, and May 25, 1896, it was bombarded by a tornado that played havoc, even shifting the massive new bridge at one end. Louisville, Kentucky, was the heaviest sufferer of all when, March 27, 1890, a cloud traversed part of the city, killing 76, injuring 200, and damaging $2,250,000 worth of property. And this cloud, described as turnip-shaped, did not touch the ground; if it had, the destruction would have been epical. As for such tornadoes as those that wiped out Grinnell, Iowa, Marshfield, Missouri, and Wellington, Kansas (1893 the latter), they were all of the classic sort, coming late in the afternoon and giving plenty of warning because of the atmospheric conditions—the alternate streaks of chilly and sultry winds, and the peculiarly appalling appearance of the sky. For the experienced a rush to the tornado cellars or caves is the custom. In the public schools of certain cities a tornado drill is one of the rules.

The most vivid description of an approaching tornado was given by Mr. John R. Musick, in a lengthy article which appeared some years ago in the *Century Magazine*. A few lines may be quoted from the story of this eye-witness, a fair example of all such storms. "About 6.30 p. m. April 27, 1899," writes Mr. Musick, "I left my house in Kirksville, Missouri, to post some letters. The day had been rather remarkable, alternating between a suffocating heat and the chilliness of early spring. Dense black clouds occasionally rolled across the saffron sky, and showers of rain alternated with bursts of sunshine followed by a dead calm. As I stepped from the door a continuous roaring off to the south-west burst on my ears. In the sky hung a lowering thundercloud, from which peals of thunder issued. Just below the cloud, seeming to rest upon the earth, was a whirling monster of vapour, dust, and smoke, coming apparently towards me, with an incessant and steadily increasing roar. The first appearance was that of a huge locomotive emitting black smoke and steam, and coming at a tremendous speed. The tornado suddenly tore itself loose from the black storm-cloud and advanced at increased speed, rotating from right to left . . . the great funnel-shaped cloud expanding and extending up into the vault of heaven, spread over the entire eastern horizon. It was a dark, steamy cloud, from which were emitted evanescent flashes of electric light." Luckily the cloud turned into another street before it reached the house of the narrarator. He tells of the devastation it caused and the freaks it played, among others carrying high in the air a young woman who, finding herself a neighbour to a flying white horse, was in much concern lest its kicking would hurt her. She was drop-

ped, but the horse was carried for two miles and not the worse for its aerial experience. These experiences are commonplaces of tornadic storms like the stripping of fowls of their feathers, the twisting of great trees as if by a monster corkscrew, the bursting apart of houses on the vacuum side of the funnel and even the drawing of corks from bottles. I have seen trees into which were driven straws, so mighty is the impact of the wind.

Now, what would happen if a Kansas "twister" should caper across the North river and squarely hit New York City where it lives highest? If one talks to the architects it will soon be discovered that the fiercest wind ever forged in the caverns of Æolus would retire rebuffed by the battlements of steel and stone. But would it? Prof. Abbe does not think so. H. H. Hazen, once of the United States Signal Office, does not believe the affair would pass off so lightly. Prof. Hazen is an authority on the subject, and his study, *The Tornado*, is a standard book of reference. Moreover, Hazen is an iconoclast in his theories. He does not altogether subscribe to the inferences made by Espy and others as to the nature of tornadic storms. He even questions whether they always whirl counter-clockwise; whether the column encloses a vacuum; whether the primal causes are entirely such as Espy believed them to be. Finally, he points to the disposition of the débris as a disconcerting evidence that the whirl may not be always in one direction. However, it may be conceded that there is an uprush in the focus of the storm, and that its origin is electrical. The thunderstorm and the tornado are first cousins in the kingdom of our sky. There is an overwhelming generation of heat in the cloud, which, as Abbe asserts without fear of contradiction, represents "a display of force beside which 10,000 great steam-engines shrink into insignificance."

It is the possibilities of American towering buildings that interest one. The higher the gale the greater the problem of strain and resistance; 70, 80, perhaps 100 miles an hour some of the new structures might successfully encounter, but a straight wind? The tornado is not a straight wind, but a circular one; it twirls, it grinds, it bores and lashes whatever it touches. It has several movements. It moves at the rate of from 30 to 80 miles an hour; what the velocity of its whirl is no man may say, though attempts have been made to compute it; 1,000 miles an hour is no doubt an over-estimate; about 250 miles an hour is nearer the truth. When the Wallingford tornado "blew off monuments in a cemetery without chipping either the upper or lower stone," it was calculated that a revolving wind of 260 miles an hour would be required to accomplish the fact. But estimates of this sort are apt to lead us astray. It is the incalculable force that strips fowls of their feathers and drives straws through railway ties that sets us to wondering if the tornado will not always be a puzzle to scientists. Its "eccentricity" manifests itself in the manner in which it rebounds from the earth or swings from side to side on its axis. Hazen declares that no two are alike in appearance or behaviour. Last summer when in London I was much interested in the accounts of a funnel-shaped storm that wrought disaster in Wales, coming through a gap in the hills and displaying all the indices of a full-fledged tornado. But such visitors are rare in Great Britain, though not in France, Austria, and certain regions of Germany. The mountains and forests are the best safeguards against tornadoes; nevertheless, it has been written: "Nothing erected by the hand of man could withstand a tornado." And on this rather pessimistic note let us close.—*Science Progress, London.*